Space Weather Forecast

Issued on Saturday, 29 June 2024 at 13:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class flares throughout. G1/Minor Storm intervals likely Day 1 (29 Jun), risk declining next few days.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: There are currently fifteen regions on the disc, most of which are small and simple. The largest regions are on the southwest quadrant and on the eastern central part. The one on the southwest quadrant has recently grown and become a little complex, with the addition of minor spots right behind the main one. The region on the eastern central part appears straightforward magnetically, its trailing part somewhat fragmenting and looking smaller. A new region is quickly developing to the north of this; it is currently relatively simple but worth monitoring. Another region is also rotating onto the northeast limb but its analysis is still made difficult as it's not yet fully visible.

There are currently numerous filaments on the Earth-facing disc, one of which looking precarious on the southeast quadrant. It will be closely monitored for any lift-off. No new Earth-directed Coronal Mass Ejections (CMEs) have been observed in coronagraph imagery in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds showed the presence of a magnetic cloud at the beginning of the period, associated with the CME that arrived earlier on the 28th. The solar wind speed has remained slightly elevated, around 430-490 km/s. The Interplanetary Magnetic Field was strong and erratic initially but soon became moderate and stable. Equally, the important north-south component started with a strong southward deviation but became less turbulent and mostly positive later in the period. Geomagnetic activity has declined through the period, starting with a G4/Severe Storm (Kp 8) between 28/1200-1500 UTC before gradually easing down to mostly Quiet during the second part.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has remained at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with a chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: The magnetic cloud associated with the CME that arrived at Earth on 28/0910 UTC is now waning. Two further and potentially Earth-directed CMEs have been observed leaving the sun, respectively on 25 and 27 June. They could both give Earth a weak glancing blow on (end of) Day 1 and Day 2 but confidence is low, with large uncertainties in timing. There are no coronal holes on the disc to give any fast wind influence.

Geomagnetic activity is expected to be Quiet to Unsettled with a chance of an Active interval but

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there is potential for a G1/Minor Storm (Kp 5) at the end of Day 1 (29th), should the expected glancing blow materialise and combine its effect with the current slightly elevated solar wind background. Conditions are then expected to become largely Quiet from Day 3 (01st) onwards.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background levels, but with a very slight chance of exceeding the S1/Minor Storm threshold should any notable flares occur from the numerous sunspots that currently occupy the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	60	20	5	1
Strong	G3	Yes	1	1	1	1
Severe	G4	Yes	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	45	45	45	45
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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